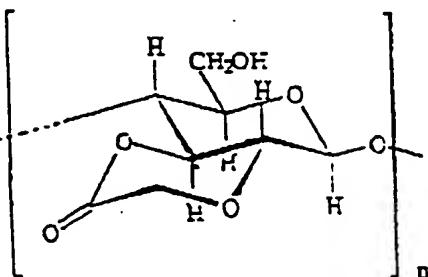


5 WE CLAIM:

1. A carboxymethyl cellulose compound according to the formula:



wherein "n" is an integer from 500 to 2000.

2. A carboxymethyl cellulose compound according to Claim 1 wherein "n" is an integer from 1000 to 15000.

3. A method for the synthesis of a lactone of polysaccharide carboxylic acids which comprises (i) providing the free acid form of the polysaccharide as a finely-powdered, anhydrous carboxylic acid with minimal sodium and potassium carboxylate content; (ii) lactonizing said polysaccharide by thermal dehydration in an anhydrous non-nucleophilic solvent; and (iii) collecting the resulting lactone product.

4. A method according to Claim 3 in which the polysaccharide carboxylic acid is selected from the group consisting of carboxymethyl cellulose, carboxymethyl alpha- and beta-dextran, carboxymethyl starch, chitosan, O,N-Carboxymethyl, O-carboxymethyl, N-carboxymethylchitosan, carboxy-starch, and pectin.

25 5. A method according to Claim 3 which further comprises conducting said lactonization in a refluxing media selected from the group consisting of xylene, toluene, diglyme, and acetonitrile.

6. A method according to Claim 5 wherein the polysaccharide carboxylic acid is carboxymethyl cellulose and lactonizing consists of (i) suspending the carboxymethylcellulose in anhydrous diglyme, (ii) heating the suspension to about 150

5 °C for about 24 hours, (iii) removing the diglyme solvent, and (iv) collecting the lactone.

7. A method according to Claim 5 wherein the polysaccharide carboxylic acid is pectin acid lactonizing consists of (i) suspending the pectin in anhydrous toluene, (ii) heating the suspension for about 24 hours, (iii) removing the toluene solvent, and (iv) 10 collecting the lactone.

8. A method according to Claim 5 wherein the polysaccharide carboxylic acid is carboxymethyl starch and lactonizing consists of (i) converting the starch to the free acid, (ii) suspending the free acid in anhydrous diglyme, (iii) heating the suspension, (iv) removing the diglyme solvent, and (v) collecting the lactone.

15 9. A polysaccharide carboxylic acid lactone product made in accordance to the method of Claim 3.

10. A method of forming a polysaccharide carboxylic acid lactone conjugate which comprises (i) ring-opening a polysaccharide carboxylic acid lactone selected from the group consisting of carboxymethyl cellulose, carboxymethyl alpha- and beta-dextran, carboxymethyl starch, chitosan, O,N-Carboxymethyl, O-carboxymethyl, N-carboxymethylchitosan, carboxy-starch, and pectin lactones; and (ii) coupling said lactone with a compound having a biological response within a targeted end-user.

20 11. A method according to Claim 10 wherein ring opening is accomplished with a nucleophilic compound.

25 12. A method for the synthesis of a therapeutic compound comprising the step of conjugating a therapeutic agent to a carboxymethyl polysaccharide utilizing a reactive lactone of said carboxymethyl polysaccharide.

13. A method according of Claim 12 wherein the carboxymethyl polysaccharide is carboxymethyl cellulose, and wherein the therapeutic agent is selected from the 30 group consisting of cisplatin, ellipticinium, aminoglutethimide, mitoxantrone, finasteride,

5     vitamin E, alpha-difluoromethylornithine, mitoguazone, and nucleophilic  
chemotherapeutic agents.

14. A method for the synthesis of a conjugated polymer comprising the step  
of conjugating an agent to a carboxymethyl polysaccharide utilizing a reactive lactone  
of said carboxymethyl polysaccharide, and wherein said agent is selected from the  
10    group consisting of an imaging diagnostic capable of binding radioactive metal ions  
for nuclear imaging or paramagnetic metal ions for magnetic resonance imaging,  
fragrances, flavorants, cis 3-hexen-1-ol, and property modifiers.

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